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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,897	09/07/2006	Tobias Lang	3804	6440

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

T/f

Office Action Summary	Application No.	Applicant(s)	
	10/591,897	LANG, TOBIAS	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to because of the following informalities:

In claim 3, lines 2-3, to avoid problems of antecedent basis, "the focal" should be ---a focal---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, because they refer to "the output signal of the comparator" while claim 4 provides "a comparator (10) whose input is supplied with a transducer output signal". Therefore, it is unclear to one having ordinary skill in the art whether "the output signal of the comparator" refers to a comparator output or the previously presented transducer output signal supplied to the comparator.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2 and 4-8, as may best be understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art in view of JP Patent Application Publication No. 2003-050145 to Eshita et al.

With respect to claim 1, Applicant admits as prior art an ultrasonic flow sensor (page 1, line 22 and Figure 1 – page 5, line 17), including at least one ultrasonic transducer for transmitting and receiving ultrasonic signals (page 1, lines 22-24 and 26-28 and Figure 1 – page 5, line 17) and a receiver unit that is connected to the ultrasonic transducer (page 6, line 30 to page 7, line 2) and detects a predetermined event of the ultrasonic signal as the reception time (page 6, lines 29-30), wherein the receiver unit is embodied in such a way that it determines the time of a value characteristic of the ultrasonic signal (page 7, lines 4-6).

With respect to claim 2, Applicant admits as prior art that the receiver unit determines a maximum amplitude of the ultrasonic signal as a characteristic value (page 7, lines 4-6).

With respect to claim 4, Applicant admits as prior art that the receiver unit includes a comparator whose input is supplied with a transducer output signal and a reference signal (page 6, line 30 to page 7, line 2 and Figure 5 – page 5, line 29), and the receiver unit determines a piece of information about the time of the characteristic value from the output signal of the comparator (page 7, lines 2-6).

With respect to claim 5, Applicant admits as prior art that the reference signal supplied to the comparator is a threshold not equal to zero (page 6, line 30 to page 7, line 4 and page 7, lines 14-15) and the output signal of the comparator is a pulse width modulated signal from which the time of the characteristic value is determined (page 7, lines 4-6 and 14-15).

With respect to claim 7, Applicant admits as prior art a method for detection of an ultrasonic signal in an ultrasonic transducer (page 1, lines 22-24 and 26-28 and Figure 1 – page 5, line 17) by means of a receiver unit (page 6, line 30 to page 7, line 2), which detects a predetermined event of the ultrasonic signal as a reception time (page 6, lines 29-30), wherein the receiver unit determines the time of a value characteristic of the ultrasonic signal (page 7, lines 4-6).

With respect to claim 8, Applicant admits as prior art that the receiver unit determines a maximum amplitude of the ultrasonic signal as a characteristic value (page 7, lines 4-6).

As noted above, the invention of AAPA teaches many of the features of the claimed invention and while Applicant does admit as Prior Art determining a reception time as well as a time value of a characteristic value of the ultrasonic signal, Applicant does not explicitly admit as prior art correcting the reception time based on a time shift between the reception and time of the characteristic value.

Eshita teaches a method and apparatus for ultrasonic flow-velocity measurement comprising an ultrasonic transducer (0014, lines 1-8), first and second comparison circuits for detecting a reception time and a time of a characteristic value of the

ultrasonic signal (0015, line 1 to 0016, line 17), and a gate circuit for receiving waveforms resulting from the first and second comparisons (0018, lines 1-5), determining a time shift between the reception time and time of the characteristic value (0027, line 1 to 0028, line 10), and correcting the reception time as a function of the time shift (0032, lines 1-8).

It would have been obvious to one having ordinary skill in the art to modify the invention of AAPA to explicitly include correcting the reception time based on a time shift between the reception and time of the characteristic value, as taught by Eshita, because, as suggested by Eshita, the combination would have improved the system of AAPA by providing means for accounting for time drifting caused by ambient noise thereby increasing the resulting measurement accuracy (0007, lines 1-10).

6. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art in view of Eshita et al. and further in view of U.S. Patent No. 4,933,915 to Bolstrom.

As noted above, the invention of AAPA and Eshita teaches many of the features of the claimed invention and while the invention of AAPA and Eshita does teach determining a maximum amplitude of the ultrasonic signal as a characteristic value, the combination does not specifically describe determining a chronological position of a focal point of an envelope curve as the characteristic value.

Bolstrom teaches a method of indicating the time of an acoustic pulse and a device for carrying out the method comprising a transducer with reception means

(column 4, lines 12-18) for determining a reference time by detecting a chronological position of a focal point of an envelope curve as a characteristic value (column 3, lines 18-25 and column 4, line 61 to column 5, line 5).

It would have been obvious to one having ordinary skill in the art to modify the invention of AAPA and Eshita to specifically describe determining a chronological position of a focal point of an envelope curve as the characteristic value, as taught by Bolstrom, because the invention of AAPA and Eshita does teach determining a maximum amplitude of the ultrasonic signal and Bolstrom suggests a method for determining a characteristic value dependent on signal peaks (column 4, lines 27-37) that would have improved the system of AAPA and Eshita by detecting a characteristic value that is not skewed by attenuation thereby providing increased accuracy in time determination (column 2, line 65 to column 3, line 3 and column 3, lines 45-60).

Response to Arguments

7. Applicant's arguments filed October 25, 2007, have been fully considered but they are not persuasive.

Applicant argues:

> Applicant has amended claim 1 to specify that receiver unit (4) uses the time shift (Δt) to determine a correct time value for the reception time (t_0). Applicant believes that claim 1, as amended, overcomes the rejections because Eshita does not teach or suggest a sensor that determines a time (t_1) of a value characteristic of the ultrasonic signal as well as a time shift (Δt) of the time (t_1) relative to the reception time (t_0) and using the time (t_1) and time shift (Δt) to determine the correct time value for time (t_0).

The Examiner asserts that Applicant has not provided any reason as to why the invention of Eshita falls short of teaching these limitations.

Instead, the Examiner maintains that Eshita does teach a sensor (i.e. transducer):

> The ultrasonic transducer with which it has been arranged by (1) separating predetermined distance to the upstream [of the direction of flow], and lower stream side in drawing 1, as for the ultrasonic flow-velocity measuring pipe, (2), and (3), The receiving amplifier where (4) outputs a received wave when the drive pulse generation circuit which generates a driving pulse, and (5) receive a supersonic wave by an ultrasonic transducer (2) and (3), (6) is a switching circuit which changes bonding of each ultrasonic transducer (2), (3), a drive pulse generation circuit (4), and a receiving amplifier (5), and these of it are the same as that of what was shown in drawing 3. (0014, lines 1-8)

that determines a time (t_1) of a value characteristic of the ultrasonic signal as well as a time shift (Δt) of the time (t_1) relative to the reception time (t_0):

> In this embodiment, the 1st comparison circuit (7) is established in the output side of the receiving amplifier (5). This 1st comparison circuit (7) outputs a received wave (W) and the square wave (K) of this period, whenever it compares with 0V the received wave (W) outputted from a receiving amplifier (5) and a received wave (W) exceeds 0V, as shown in drawing 2 (a) and (b). This square wave (K) is used when it corresponds to a received wave (W), it is continuously outputted if it is **, and counting the wave number of a received wave (W) in the below-mentioned n ** counter (12), since it is a received wave (W) and this period.
>
> Moreover, similarly the 2nd comparison circuit (8) and latch circuitry (9) are established in the output side of the receiving amplifier (5). The received wave (W) outputted from a receiving amplifier (5) as this 2nd comparison circuit (8) is shown in drawing 2 (a), When the reference-voltage value Vth outputted from circuit generating reference voltage (10) is compared and a received wave (W) reaches the reference- voltage value Vth for the first time, a receiving decision signal is outputted, and thereby, the receipt-of-letter judging of a supersonic wave is performed. In this embodiment, as the 2nd wave (W2) of a received wave (W) falls, the reference-voltage value Vth is set up to reach the reference-voltage value Vth. (0015, line 1 to 0016, line 17)

The rest finds the time from the event of a supersonic wave being transmitted using a clock wave etc. to receiving reaching timing as propagation time tau of the supersonic wave of a direction of easy flow.

After [in this way,] finding the propagation time tau of the supersonic wave of a direction of easy flow It changes so that a drive pulse generation circuit (4), and the ultrasonic transducer by the side of the lower stream (3), the ultrasonic transducer by the side of the upstream (2) and a receiving amplifier (5) may be connected by actuation of a switching circuit (6), and it asks for ultrasonic propagation time tau' of a reverse direction like ****. Since the propagation time difference (tau-tau') which changes according to the flow velocity has arisen, the propagation time tau of the supersonic wave of these directions of easy flow and a reverse direction and tau' search for the flow velocity of the fluid based on this propagation time difference (tau-tau'), and calculate the fluid flow if needed further. (0027, line 1 to 0028, line 10)

and using the time (t_1) and time shift (Δt) to determine the correct time value for time (t_0):

Moreover, although propagation time of the supersonic wave was made into the time from the event of a supersonic wave being transmitted to ultrasonic reaching timing, it is good also as time of the event of subtracting or adding predetermined time to ultrasonic reaching timing from the event of a supersonic wave being transmitted. For example, it is good by subtracting predetermined time from received wave (W) reaching timing also considering the time of the event of the supersonic wave being first received from the event of asking for the event of a supersonic wave being received first, and a supersonic wave being transmitted as propagation time of a supersonic wave. (0032, lines 1-8).

Applicant argues:

Additionally, Bolstrom teaches an invention that measures the volume of a static fluid in a tank by detecting acoustic waves that reflect from the under side of the interface between the surface of th efluid and the air above. Eshita teaches a method of using ultrasonic pulses sent from a transducer to a reciver to measure the flow rates of fluids including gasses. One of ordinary skill in the art at the time that the invention was made would have no motivation to combine the two inventions because they use disparate methods to perform different functions.

The Examiner asserts that invention of Bolstorm is only included to specifically describe determining a chronological position of a focal point of an envelope curve as the characteristic value and since the invention of AAPA and Eshita does teach determining a maximum amplitude of the ultrasonic signal, it would have been obvious to one having ordinary skill in the art to modify the invention of AAPA and Eshita to specifically describe determining a chronological position of a focal point of an envelope curve as the characteristic value, as taught by Bolstrom, because Bolstrom suggests a method for determining a characteristic value dependent on signal peaks (column 4, lines 27-37) that would have improved the system of AAPA and Eshita by detecting a characteristic value that is not skewed by attenuation thereby providing increased accuracy in time determination (column 2, line 65 to column 3, line 3 and column 3, lines 45-60).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 4,583,410 to O'Neil teaches a timing circuit for acoustic flow meters.

U.S. Patent No. 4,603,589 to Machida teaches an ultrasonic flowmeter.

U.S. Patent No. 4,922,750 to Magori teaches an ultrasound phase difference method for measuring high flow rates.

U.S. Patent No. 5,035,147 to Woodward teaches a method and system for digital measurement of acoustic burst travel time in a fluid medium.

U.S. Patent No. 6,634,240 to Wallen teaches a zero crossing detector and method for determining a zero crossing point.

U.S. Patent No. 5,421,212 to Mayranen et al. teaches a method and device in acoustic flow measurement for ensuring the operability of said measurement.

U.S. Patent No. 4,542,656 to Johnson teaches fluid flow monitoring.

U.S. Patent No. 4,022,058 to Brown teaches an apparatus for determining the arrival time of alternating signals.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on (571)272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jeffrey R. West
Primary Examiner
Art Unit – 2857
January 6, 2008